UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

FORAGE HARVEST MANAGEMENT

(Acre)

CODE 511

DEFINITION

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage.

PURPOSES

- Optimize the economic yield of forage at the desired quality and quantity
- Promote vigorous plant regrowth
- Maintain stand life for the desired time period
- Maintain desired species composition of the stand
- Use forage plant biomass as a nutrient utilization crop
- Control insects, diseases, and weeds
- Maintain and/or improve wildlife habitat

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where machine harvested forage crops are grown.

CRITERIA

Forage will be harvested at a frequency and height that will maintain a desired and healthy plant community through its life expectancy.

Maturity Stage and Harvest Interval

Harvest forage at the stage of maturity that provides the desired quality and quantity. Refer to Table 1 and Table 2 for stage to harvest for acceptable quality and yield.

Cut forage plants at a harvest interval that will provide adequate food reserves and/or basal or axillary tillers or buds for regrowth and/or reproduction to occur without loss of plant vigor.

Cut reseeding annuals at a stage of maturity and frequency that ensures the production of viable seed or ample carryover of hard seed to maintain desired stand density.

If plants show signs of short-term environmental stress, management will be applied in a manner that ensures continued health and vigor of stand.

Delay harvest if prolonged or heavy precipitation is forecast that would seriously damage cut forage.

Where weather conditions make it difficult to harvest the desired quality of forage, use mechanical or chemical conditioners and/or ensile.

Stubble Height

Cut forage plants at a height that will promote the vigor and health of the desired species. Cutting heights will provide adequate residual leaf area; adequate numbers of terminal, basal, or axillary tillers or buds; insulation from extreme heat or cold; and/or unsevered stem bases that store food reserves needed for full, vigorous recovery. Table 1 contains minimum cutting heights for forages commonly grown in Alabama.

Manipulate timing and cutting heights of harvest to ensure germination and establishment of reseeding or seeded annuals.

Moisture Content

Harvest silage/haylage crops at the ideal moisture range for the type of storage structure(s) being utilized.

Treat direct cut hay crop silage (moisture content > 70%) with chemical preservatives or add dry feed stuffs to avoid fermentation and seepage losses.

For optimal forage quality, rake, ted, or invert swaths, and bale while hay still has sufficient moisture to prevent leaf loss.

Bale at optimum moisture levels to preserve forage quality and quantity. Approximate percent moisture should be as follows:

- Bale field-cured hay at 15 to 20 percent moisture.
- Bale forced air-dried hay at 20 to 35 percent moisture.
- Rake hay at 30 to 40 percent moisture.
- Ted or invert swaths when moisture is above 40 percent.

Length of Cut

When harvested for ensilage forage will be chopped to a size that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

Contaminants

Forage shall not contain contaminants at levels injurious to the health of the livestock class and type being fed.

Contaminants are any objectionable matter or toxin that can cause illness, death, or rejection of the offered forage.

Nutrient Utilization Crop

Employ a harvest regime that utilizes the maximum amount of available or targeted nutrients.

Disease, Insect, and Weed Infestations

If a foliar disease, insects, or weeds threaten stand survival or production objectives, schedule harvest periods as needed to control disease, insect, and weed infestations.

When weed infestation exceeds the economic threshold and is uncontrollable by forage harvest management alone, weed control should be planned and applied. Coordinate this practice with Pest Management - 595.

When insect and disease outbreaks exceed economic thresholds and are uncontrollable by harvest management pesticide applications may be needed. Another option is to select a resistant cultivar when the stand is replaced. See Pest Management - 595.

Lessen incidence of disease, insect damage, and weed infestation by managing for desirable plant vigor.

Wildlife Habitat Improvement

Maintain appropriate harvest schedule(s); cover patterns, and plant height to provide suitable habitat for the desired specie(s).

CONSIDERATIONS

When pastures produce forage in excess of livestock demand during periods of high growth rate, consider preserving forage quality by machine harvesting a portion of the standing crop. Coordinate this practice with Prescribed Grazing - 528.

Well-fertilized plants withstand more intense harvest schedules and may produce a higher quantity and quality of forage. Coordinate this practice with Nutrient Management -590.

Select cultivars that are suitable for the harvest regime, species mix, and forage quality desired. For specific nutrient uptake, select species that can maximize uptake.

To control forage plant diseases, insects, and weeds, clean harvesting equipment after harvest and before storing. Do not cut forages until dew, rain, or irrigation water on leaves has evaporated.

Direct cut grass and legume silage can create silage leachate (seepage). Consider the collection, storage, and disposal of this leachate as part of an agricultural waste management system.

In conjunction with harvest options, explore storage and feeding options that will retain acceptable forage quality and minimize digestible dry matter loss.

In regions where rainfall and/or humidity levels cause unacceptable forage quality losses in at least one harvest during the year, consider ensiling the forage to reduce or eliminate field-drying time. Other options are: the use of desiccants, preservatives, conditioners, macerating implements, or barn-curing techniques to reduce field drying time, greenchopping, or grazing. These techniques

can improve the timeliness of harvest and help preserve forage quality.

To reduce safety hazard, avoid operating harvesting and hauling equipment on field slopes over 25 percent, particularly on cross slope traffic patterns.

PLANS AND SPECIFICATIONS

Place the detailed specifications in a site-specific job or design sheet, or in the practice narrative of the conservation plan.

These plans and specifications shall be consistent with this standard and shall describe the requirement for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Before forage harvest, clear fields of debris that could damage machinery, or if ingested by livestock, lead to sickness (for example, hardware disease) or death.

Monitor weather conditions and take action accordingly before and after cutting to optimize forage wilting or curing time to preserve feed quality and prevent forage swaths or windrows from smothering underlying plants.

Inspect and repair harvest equipment following manufacturer's preventative maintenance procedures.

All shields shall be in place during machine operation to prevent injury or death. Shut off machinery before working on or unplugging moving parts.

Select equipment sizes and capacities that will handle the acreage normally harvested in a timely and economically feasible manner.

Operate all forage harvesting equipment at the optimum settings and speeds to minimize loss of leaves.

Set shear-plate on forage chopper to the proper theoretical cut for the crop being harvested. Keep knives well sharpened. Do not use recutters or screens unless forage moisture levels fall below recommended levels for optimum chopping action.

Regardless of silage/haylage storage method, ensure good compaction and an airtight seal to exclude oxygen and mold formation.

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Table 1
Hay Harvesting Guide

SPECIES	HARVEST	STAGE TO HARVEST FOR ACCEPTABLE QUALITY & YIELD	MINIMUM CUTTING HEIGHT
			inches
Alfalfa	1st cutting	Full bud	3
	Other cuttings	1/10 bloom	3
Arrowleaf Clover	Only one cutting	Early bloom	2
Bahiagrass	1st cutting	Boot to bloom	2
	Other cuttings	Every 4 - 5 weeks or when	2

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		12 inches high	
Bermudagrass Hybrid	1st cutting Other cuttings	15 to 18 inches height Every 4 to 5 weeks or when regrowth is 15 inches high.	2 2
Dallisgrass	Usually only one cutting	Boot to Bloom	3
Eastern Gamagrass*	All cuttings	Boot to early head	8
Fescue, Tall	1st cutting Other cuttings	Boot to early head Every 4 - 6 weeks or when regrowth is at least 10 inches.	3 3
Johnsongrass*	All cuttings	Boot	8
Lespedeza, Annual	Only one cutting	Early bloom & before bottom leaves begin to fall	2
Millet, Pearl	All cuttings	Height of 30 to 40 inches	6
Orchardgrass	Same as tall fescue	Same as tall fescue	3
Ryegrass	Usually one cutting	Boot to early head	2
Small Grains	Only one cutting	Boot to early head	2
Sericea*	All cuttings	15 to 18 inches high	4
Sudangrass & Sorghum-Sudan Hybrids	All cuttings	Height of 30 to 40 inches	6
Switchgrass*	All cuttings	Boot	8

*The last cutting should be early enough to allow for regrowth to build up carbohydrates in the root systems before frost. After frost, the regrowth may be cut for hay or grazed.

Table 2
Green-Chop and Ensilage Harvesting Guide*

SPECIES	HARVEST	STAGE TO HARVEST FOR ACCEPTABLE QUALITY & YIELD
Alfalfa	1st cutting Other cuttings	Bud to early bloom 1/10 bloom
Bermudagrass, Hybrid	1st cutting Other cuttings	15 inches height Every 4-6 week or when regrowth is 15 inches high
Cool season grasses - Orchardgrass & tall fescue	1st cutting Other cuttings	Boot to early head Every 4 - 6 weeks or when regrowth is at least 10 inches

Corn	One cutting	Full dent stage
Eastern Gamagrass**	All cuttings	Boot to early head
Johnsongrass**	All cuttings	Boot
Millet, Pearl	All cuttings	30 to 40 inches
Ryegrass	One cutting usually	Boot to early head
Small Grains	One cutting	Boot to early head
Sorghum, grain	One cutting usually	Milk to dough, before leaf blade begin to die
Sorghum, forage	All cuttings	40 inches to late boot
Sorghum, sweet	One cutting	Milk to dough, before leaf blades begin to die
Sorghum-Sudan hybrids	All cuttings	40 inches to boot, whichever come first
Soybeans	One cutting	Late bloom - seed forming in pods & before lower leaves began to drop

* For perennial crops and annual crops that will be harvested by more than one cutting refer to the minimum cutting height in Table 1.

**The last cutting should be early enough to allow for regrowth to build up carbohydrates in the root systems before frost. After frost, the regrowth may be cut for hay or grazed.